

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
 (Chapter II of the Patent Cooperation Treaty)  
 (PCT Article 36 and Rule 70)

Applicant's or agent's file reference 12474260	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. PCT/AU2004/000956	International filing date (day/month/year) 16 July 2004	Priority date (day/month/year) 18 July 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. <sup>7</sup> A41D 13/00		
Applicant ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.	
2. This REPORT consists of a total of 3 sheets, including this cover sheet.	
3. This report is also accompanied by ANNEXES, comprising:	
a.	<input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
	<input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
	<input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in Item 4 of Box No. I and the Supplemental Box.
b.	<input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:	
<input checked="" type="checkbox"/>	Box No. I Basis of the report
<input type="checkbox"/>	Box No. II Priority
<input type="checkbox"/>	Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI Certain documents cited
<input type="checkbox"/>	Box No. VII Certain defects in the international application
<input type="checkbox"/>	Box No. VIII Certain observations on the international application

Date of submission of the demand 18 May 2005	Date of completion of the report 24 May 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  BARRY STEPHENS Telephone No. (02) 6283 2106

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000956

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1 (b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-39 as originally filed/furnished
- pages\* received by this Authority on with the letter of
- pages\* received by this Authority on with the letter of
- ☒ the claims:
- pages as originally filed/furnished
- pages\* as amended (together with any statement) under Article 19
- pages\*40-43 received by this Authority on 18 May 2005 with the letter of 18 May 2005
- pages\* received by this Authority on with the letter of
- ☒ the drawings:
- pages 1/24-24/24 as originally filed/furnished
- pages\* received by this Authority on with the letter of
- pages\* received by this Authority on with the letter of
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000956

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims 1-33	YES
	Claims NONE	NO
Inventive step (IS)	Claims 1-33	YES
	Claims NONE	NO
Industrial applicability (IA)	Claims 1-33	YES
	Claims NONE	NO

## 2. Citations and explanations (Rule 70.7)

None of the citations disclose or suggest the claimed invention when considered either singly or in any obvious combination. In particular, none of the citations disclose an article of clothing comprising a phase-change material which has a melting point from 10 to 30 deg C and a melting temperature range of from 1 to 5 deg C.

10/565319

PCT/AU2004/000956  
Received 18 May 2005

IAP20 Rec'd PCTO 18 JAN 2006

- 40 -

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An article of clothing comprising a phase change material which is a blend of at least two compounds and which has a melting point of from 10 to 30°C and a melting temperature range of from 1 to 5°C, wherein the phase change material is provided in discrete pouches and wherein the pouches are fitted into regions which in use are likely to come into proximity with body sites of high heat dissipation.
2. An article of clothing according to claim 1, wherein the phase change material has a melting point of from 10°C to 25°C.
3. An article of clothing according to claim 1 or claim 2, wherein the phase change material has a melting point of about 22°C.
4. An article of clothing according to claim 1, wherein the phase change material has a melting point range of from 1 to 4°C.
5. An article of clothing according to claim 1, wherein the phase change material has a heat of fusion of 150 kJ/kg to 250 kJ/kg.
6. An article of clothing according to claim 1, wherein the phase change material undergoes less than 17% expansion on complete melting.
7. An article of clothing according to claim 1, wherein the phase change material is encapsulated by a laminate film, wherein the laminate film comprises an outer heat-sealing layer and an inner layer which is impermeable to the phase change material.
8. An article of clothing according to claim 7, wherein the laminate is a three-layer film comprising a layer which is impermeable to the phase change material interposed between heat sealing layers.

- 41 -

9. An article of clothing according to claim 7 or claim 8, wherein the overall thickness of the laminate is from 30 to 150 $\mu$ m.
10. An article of clothing according to claim 7, wherein the laminate comprises a layer of (biaxially oriented) nylon interposed between layers of LLDPE.
11. An article of clothing according to claim 10, wherein the nylon layer is from 10 to 50 $\mu$ m thick and the LLDPE layers from 50 to 100 $\mu$ m thick.
12. An article of clothing according to claim 11, wherein the nylon layer is about 15 $\mu$ m thick and each layer of LLDPE about 51 $\mu$ m thick.
13. An article of clothing according to claim 1, wherein the phase change material is contained in a number of individual and slender pouches which enable a flexible article of clothing to be prepared.
14. An article of clothing according to claim 1, wherein each pouch has a heat exchange surface area to volume ratio of from 1.06 to 1.20.
15. An article of clothing according to claim 1, wherein the pouches are inserted into pockets within the article and sealed therein, either permanently or removably.
16. An article of clothing according to claim 1, wherein the material from which the article is made is lightweight and breathable, and shaped so that in use the pouches will be in close proximity to the wearer's skin.
17. An article of clothing according to claim 1, in the form of a jacket or vest, wherein the phase change material is concentrated to provide a high level of cooling to the chest, back and/or shoulder areas.

30

- 42 -

18. An article of clothing according to claim 1, in the form of a jacket or vest, wherein the pouches are provided in a rib-like arrangement across the front and back of the jacket or vest.
- 5 19. An article of clothing according to claim 1, wherein the pouches do not extend over flex points in the article of clothing.
20. An article of clothing according to claim 1, comprising inner and outer shells, the inner shell being adapted to receive pouches containing the phase change material.
- 10 21. An article of clothing according to claim 1, further comprising one or more suitably positioned fittings that allow a thermal exchange surface of the article to be brought into close contact with the wearer's body, or parts thereof.
- 15 22. An article of clothing according to claim 1, comprising pouches containing different types of phase change materials depending upon the location of the pouch within the article of clothing.
- 20 23. An article of clothing according to claim 22, wherein in areas of the article corresponding to regions of the body of high heat loss, the pouch(es) contain a phase change material having a relatively high heat of fusion and wherein in areas of the article corresponding to regions of the body is where heat loss is lower the pouch(es) contain a phase change material having a lower heat of fusion.
- 25 24. An article of clothing according to claim 1, further comprising one or more ice packs.
25. An article of clothing comprising a phase change material having a melting point of about 6°C and a phase change material having a melting point of about 22°C, wherein each
- 30 phase change material has a melting temperature range of from 1 to 5°C.

- 43 -

26. Use of an article of clothing for pre-event, intra-event, inter-event and/or post-event cooling of an athlete, wherein the article of clothing comprises a phase change material which is a blend of at least two compounds and which has a melting point of from 5 to 30°C and a melting temperature range of from 1 to 5°C.
- 5
27. Use of an article of clothing to reduce the core body temperature of an individual such that after completing a warm-up or pre-event routine without the article of clothing the core body temperature of the individual is approximately the same, or even slightly lower, than that before cooling was initiated, wherein the article of clothing comprises a
- 10 phase change material which is a blend of at least two compounds and which has a melting point of from 5 to 30°C and a melting temperature range of from 1 to 5°C.
28. Use according to claim 27, wherein the desired overall reduction in core body temperature is achieved by using the article of clothing before, after or during application
- 15 of some other method of cooling the body.
29. Use according to claim 28, wherein the other method of cooling the body is a cool or cold shower.
- 20 30. Use of an article of clothing according to claim 28 to provide a cooling helmet.
31. Use of an article of clothing according to claim 1, to provide a cooling garment to be worn under protective clothing.
- 25 32. Use of an article of clothing according to claim 1 in medicine where cooling of the body or a part thereof is beneficial.
33. Use according to claim 32 for the management and/or treatment of ectodermal dysplasia, multiple sclerosis or head trauma.

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**